sive evolution is misleading." "Rudimentary organs and institutions resemble the primitive states of these, in so far as they no longer possess certain parts which the primitive stages did not yet possess. None the less profound differences exist between the primitive and the reduced forms." This difference lies largely in the difference of potentiality of the primitive and the degenerate organ to vary in the direction of new uses. "After a certain degree of atrophy, there is no longer the possibility of re-development to resume old or to acquire new functions."

The Degeneration is in Book III. attributed to (1) lack of space; (2) lack of use; (3) lack of nutrition, as in the genitalia of neuter bees; (4) atrophy without apparent cause. If a functionless organ persists it is because neither variation nor selection has intervened. The struggle for existence between the various organs and the struggle for existence between various organisms are in the opinion of these authors 'the principal if not the sole agents in degeneration,' while inutility of function, insufficiency of nutriment or resource, and lack of space are occasional causes of degenerative evolution.

The book is written in a popular and entertaining style.

C. H. EIGENMANN.

Sounding the Ocean of Air. By A. LAWRENCE ROTCH, S.B., A.M. Romance of Science Series. London, Society for Promoting Christian Knowledge, and New York, E. and J. B. Young. 1900. Small 8vo. Pp. 184. $1.00.

The work in kite meteorology carried on during the past six years at Blue Hill Observatory under the direction and through the liberality of Mr. A. Lawrence Rotch needs no introduction to the readers of SCIENCE. Mr. Rotch's pioneer work in scientific kite-flying has received the stamp of official approval at the hands of the International Meteorological Conference and of the International Aeronautical Committee, and similar investigations have lately been begun at several of the European meteorological observatories. 'Sounding the Ocean of Air' is the attractive title of a little book, issued in the Romance of Science Series, which comprises six lectures delivered by the author before the Lowell Institute of Boston, in December, 1898. The subjects dealt with in the six chapters are 'The Atmosphere'; 'Clouds'; 'Balloons'; 'Ballons-sondes for Great Altitudes'; 'Kites,' and 'Results of Kite-Flights at Blue Hill.' The whole volume presents a clear and systematic account of the history and present status of the exploration of the free air. The last chapter, on the 'Results of the Kite-Flights at Blue Hill,' gives a useful summary, almost too condensed for understanding without careful study, of the notable results obtained by Mr. H. H. Clayton, of the Blue Hill Observatory staff, from the records made by the kite meteorograph. This chapter will, therefore, probably have the greatest interest for meteorologists, although the chapter on Clouds, in which the Blue Hill cloud work is given special attention, is hardly less important. This little book is to be recommended to all who wish to inform themselves concerning the work that is now being done in 'sounding the ocean of air,' as Mr. Rotch has happily phrased it. The volume emphasizes once again the high scientific quality of the work done by Messrs. Clayton, Fergusson and Sweetland, under Mr. Rotch's direction, at Blue Hill Observatory. The dedication is so appropriate as to deserve quotation here: "This little Book is gratefully dedicated to the late Augustus Lowell, Esq., of Boston, U. S. A., who, as Trustee of the Lowell Institute, enabled Scientific Men of Two Continents to present the Results of their Investigations to the Public."

R. DEC. WARD.

HARVARD UNIVERSITY.

Free-hand Perspective. By VICTOR T. WILSON. New York and London, Wiley and Sons; Chapman & Hall. 1900. 8vo. Pp. xii + 257. Ill., 139.

This is a work intended for use in a section of the free-hand classes of the drawing departments of technical schools and in similarly appropriate work. It is seldom that the writer of a book of this class can now expect to bring out anything essentially original in either matter or manner, or treatment generally. In this case, however, original genius has found expression, and we discover in Mr. Wilson's book some entirely new and very valuable matter;

while the system and tone of the discussion are characteristic of the expert in this department.

In consequence of the fact that the free-hand classes are usually formed before the student has studied descriptive geometry, the writer of this work had found it necessary to give him some introductory work in that branch, and it thus furnishes a valuable series of exercises introductory to the more formal treatment of that subject later. The book is, in fact, a discussion of the principles of linear perspective as employed in free-hand sketching. The illustrations throughout the book are especially interesting as being *fac simile* reproductions of such actual sketches, made with a free hand, in the course of regular class work. The departure from the absolute perfection of line obtainable with instruments is clearly observable; but the accuracy of these lines, rectilinear and curvelinear, made by the unaided hand, is a beautiful illustration of the nicety with which the senses may be developed in this field. A comparison of Fig. 126 with the immediately succeeding sketches, all of which are of peculiar interest, illustrates this point. Nearly all the illustrations are curiously perfect, in line and in tone, as illustrative of free-hand work.

The last chapter, 'Sketches from Working Drawings,' involves the most original of the author's inventions and the most helpful, to the student of mechanism. The methods of sketching from simple drawings are indicated and examples given, the principles of location of line and angle and plane are shown very clearly and a system is developed for the production of a perspective drawing of the object when the only data available are to be obtained from the ordinary plan and elevation of the working drawing of the shop. The perfection and the extensive applicability of this new system are well exhibited in the progression from Fig. 111 to Fig. 114, in which a steam-engine crosshead is thus treated; in Fig. 118 and Fig. 119, in illustration of a complicated casting for an engine-bed, and even more remarkably in Figs. 133–136, where a very difficult form of beam and bell-crank for a pumping engine is brought out. The teaching of this new art, to the young engineer, particularly, is likely to give him great facility in the reverse process of reading the working drawing, and it must prove very helpful; especially, where he is compelled to explain to the workman drawings of peculiar or complicated forms, and shapes difficult to picture in the mind's eye, as the pattern-maker and the finisher must picture every piece on which he is to work and with no other aid to his imagination than the plans and elevation of the working drawings.

Mr. Wilson has made a distinct advance in his art, an invention of striking interest, one probably of no small value.

R. H. Thurston.

Our New Prosperity. By Ray Stannard Baker. New York, Doubleday & McClure Co. 1900. 12mo., pp. 267; many illustrations. Price, $1.50.

There is a class of books, illustrated by Carnegie's 'Triumphant Democracy,' Wright's 'Industrial Evolution of the United States,' Gannett's 'Building of a Nation,' and Dr. Strong's 'Our Country,' which should interest, absorbingly interest, every thinking man, especially every American citizen, and still more especially every young man. To this class belongs Mr. Baker's new book. It is a condensed and very impressive statement, based upon official statistics, of the conditions which have brought about the present extraordinary flood of prosperity in all industrial departments in this country, the good results that followed the trying period of 'hard times' of earlier years in the clearing off of old scores and reduction of the business of the country to a solid basis, the effects of the 'prosperity wave' at home and abroad, the development of the industries of the New South, the 'invasion of the world' by the exporters and manufacturers of the United States, and glances at the prognostications of a future, not likely to be free from trouble and an occasional retrogression, but on the whole one of enormous promise, and apparently of certain rise to as yet unimagined greatness. The statistical matter, which constitutes the main and fundamental portion of the work, comes from the Treasury Department bureaux, those of the Mint, the Labor Commissioner, the Geological Survey and the various other departments at Washington, with acces